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## C-A OPERATIONS PROCEDURES MANUAL

### 2.10 Maintenance Management Policy

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Attachments

Hand Processed Changes

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Approved: \_\_\_\_\_ *Signature on File* \_\_\_\_\_  
 Collider-Accelerator Department Chairman Date

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## **2.10 Maintenance Management Policy**

### **1. Introduction**

Maintenance of the C-A Accelerators, and associated equipment, occurs during both the operating cycle and during the shutdown period. During the operating cycle, both scheduled and unscheduled shutdowns occur which allow for preventive and corrective maintenance actions to occur. During the shutdown the bulk of preventive maintenance occurs and corrective maintenance, which was able to be deferred from the operating period is addressed. During the shutdown, in conjunction with maintenance actions machine modifications are scheduled. All equipment is maintained according to standard practices developed by the responsible support group. Support group supervisors are responsible for the maintenance of their assigned systems and equipment. This responsibility includes, as appropriate based on operational and ES&H risk, the following:

- 1.1 Development of a master list of Support Groups who carry out maintenance responsibilities (see [C-A-OPM-ATT 2.10.a](#)).
- 1.2 Development of preventive and predictive maintenance procedures that includes periodic inspection, testing and maintenance, post-maintenance testing, and implementation of seasonal requirements.
- 1.3 Development of associated record keeping that includes periodic maintenance requirements, listing of past maintenance actions, and warrantee information.
- 1.4 Performance of corrective maintenance including analysis and determination of required spares inventory.
- 1.5 Determination of required personnel training including BNL offered, C-A specific, and group OJT training.

### **2. Guidelines**

#### **2.1 Scheduling Responsibilities**

- 2.1.1 During the machine running cycle, maintenance periods are scheduled with a start date and time, and duration agreed upon by the Accelerator Division Head or the Head of Operations, the Facility & Experimental Support (F&ES) Division Head, and the Scheduling Physicist. The Scheduling Physicist will publicize the schedule in the weekly Time Meeting.
- 2.1.2 Supervisors are responsible to determine the extent of the maintenance to be performed and coordinate it with the other system supervisors. This coordination takes place during the weekly maintenance coordination

meeting, run by the C-A Maintenance Coordinator, and attended by all supervisors involved with maintenance activities. During the shutdown period, the same weekly maintenance coordination meeting occurs to schedule and coordinate that portion of the total shutdown period maintenance activity, which will occur the upcoming week.

## 2.2 Individual Responsibilities

- 2.2.1 **C-A Chairman:** The C-A Chairman has the responsibility to assure that the C-A systems are maintained in a manner consistent with BNL ES&H policy and the programmatic goals of the department. This responsibility is delegated to the two C-A Division Heads (Accelerator and Facilities & Experimental Support).
- 2.2.2 **C-A Division Heads:** C-A Division Heads have the responsibility to assure that systems are maintained in a manner which maximizes operational efficiency and maintains the machine safety envelope. This responsibility is delegated by the Division Heads to the support group supervisors.
- 2.2.3 **C-A Support Group Supervisors:** C-A Support Group Supervisors have the responsibility to assure that the day-to-day maintenance activities are performed. A list of support groups and their associated systems is contained [in C-A-OPM-ATT 2.10.a](#). Supervisors (or designees) are responsible for informing the Maintenance Coordinator of all intended work, any problems encountered, and provide him with a final summary of the actual work completed.
  - 2.2.3.1 **C-A Support Groups:** Support Groups are responsible for performing preventive and corrective maintenance for equipment or systems under their purview. They are responsible for reporting problems encountered to the Support Group Supervisor.
- 2.2.4 **Maintenance Coordinator:** The Accelerator Division Maintenance Coordinator, and the Facilities & Experimental Support Technical Supervisor (F&ES TS) oversee the coordination of all maintenance work that is decentralized in the various support groups. The Accelerator Division Maintenance Coordinator assures that the maintenance period ends at the specified time, and presents a summary of completed tasks to the Operations Coordinator at the end of the maintenance period. The Accelerator Division Maintenance Coordinator is responsible for notifying the Head of Operations when the maintenance period has ended.
- 2.2.5 **Operations Coordinators:** Operations Coordinators are responsible for restarting the C-A using OPM procedures after maintenance periods.

- 2.2.6 **The MCR Operators, Collider-Accelerator Support Group (CAS), Main Magnet Power Supply Operators, C-A Support, and the Cryogenic Systems Operations:** These groups are responsible to ensure that equipment is secured and re-energized as required, at the start and end of the maintenance period, according to written procedures.

2.3 Work Planning Safety Procedures to be Followed During Maintenance

- 2.3.1 [C-A OPM 2.28, "C-A Procedure for Enhanced Work Planning"](#) shall be followed.
- 2.3.2 For work at C-A involving non-C-A Departments or Divisions, [C-A OPM 1.11](#), "Department Requirements for Interaction with C-A", shall be followed.
- 2.3.3 For contractor employees, [OPM 1.12](#) "Conduct of Training Policy" (Training Plan Training) for Contractor Employees Overseen by The C-A Department", shall be followed.

2.4 Preventive and Predictive Maintenance Programs (PM)

- 2.4.1 The complexity and methods for scheduling, controlling, and documenting preventive and corrective maintenance may vary depending on the quantity and importance (QA level) of the equipment, and nature of PM activities. For purchased equipment, manufacturers recommendations should be considered as the initial baseline of requirements with the scope and periodicity modified according to actual operating experience. Run to failure is an acceptable mode of operation for equipment not suitable to PM or where PM is not cost effective. Run to failure mode is unacceptable when addressing significant programmatic interruptions or significant safety issues.
- 2.4.2 Implementation of PM on the [fire protection](#) system and electrical equipment/system maintenance, reference C-A-PD-001, Electrical Equipment/Systems Preventative Maintenance, within the C-A facility, will be reviewed by the C-A QA Office on an annual basis. Inspection of the specific electrical equipment/system, reference PD-001, within the C-A facility, will be verified semiannually, via a QA review of the C-A Tier One program These QA reviews shall consist of verifying:
- Adherence to documented schedules
  - Completion of required documentation
  - Appropriate documentation acknowledging/approving schedule slip
  - Appropriateness of specified/referenced procedures

2.4.2.1 The C-A Power Distribution Group Leader shall coordinate, via monthly meetings, maintenance of the electrical equipment/systems with the BNL Plant Engineering line crew and electrician supervisors.

## 2.5 Corrective Maintenance Program (CM)

2.5.1 Corrective Maintenance occurs as needed to support machine and experiment operations. Machine CM activities shall be reported in the C-A Trouble Reporting System, [C-A OPM 2.9](#), so that adverse trends can be analyzed and corrective actions to improve machine operating efficiency can be developed. To minimize preventable repeated failures, significant corrective maintenance activities shall be analyzed by the Trouble Report Committee (TRC), to ensure that the proper maintenance actions have occurred and that future actions are initiated to prevent reoccurrence of similar failures.

## 3. References

- 3.1 [C-A-OPM 1.11 BNL Department/Division Requirements for Interaction with C-A](#)
- 3.2 [C-A-OPM 1.12 "Conduct of Training Policy \(Training Plan\)"](#)
- 3.3 [C-A-OPM 2.9 "Trouble Reporting"](#)
- 3.4 [C-A-OPM 2.28 "C-A Procedure for Enhanced Work Planning"](#)
- 3.5 C-A-PD-001, Electrical Equipment/Systems Preventative Maintenance

## 4. Attachments

- 4.1 [C-A-OPM-ATT 2.10.a, "C-A Master List of Support Groups Who Carry Out Maintenance Responsibilities"](#).